

Honeywell tapped to manage Sandia

New management group also includes Northrop Grumman and Universities Research Association

NNSA has awarded National Technology and Engineering Solutions of Sandia (NTESS) with the management and operating contract for Sandia National Laboratories.

NTESS is a wholly owned subsidiary of Honeywell International. Northrop Grumman and Universities Research Association will support NTESS in the performance of this contract. The award is valued at \$2.6 billion annually over 10 years, if all options are exercised.

In a news release announcing the contract award, NNSA Administrator Lt. Gen. Frank Klotz said, "Following a full and open competition, NNSA is pleased to announce the selection of NTESS as our M&O partner at Sandia. The Sandia bid generated unprecedented interest from across industry, demonstrating that our improved acquisitions process is attracting high-quality competition and the best talent to serve NNSA's mission."

Solicitation for the Sandia M&O contract incorporated a number of governance initiatives launched by DOE following recommendations from the Congressional Advisory Panel on the Governance of the Nuclear Security Enterprise (Augustine-Mies Report), Commission to Review the Effectiveness of the National Energy Laboratories, and the Secretary of Energy's Advisory Board.

In a tweet immediately following the NNSA announcement, Honeywell said, "Excited to be on the team chosen by @NNSANews to manage Sandia Labs & continue world-leading science & tech research."

In a message to members of the workforce, Sandia President and Laboratories Director Jill Hruby said, "I want to thank Lockheed Martin Corporation for the guidance and leadership it has provided to Sandia National Laboratories since 1993. Under their contract management, the Labs have continued to take on the nation's toughest security challenges while simultaneously establishing more mature business models and practices. Without a doubt, Sandia is known as a laboratory that delivers engi-

Honeywell

neered solutions that can be trusted."

The current Sandia M&O contract expires on April 30, 2017, allowing for a four-month transition period. According to NNSA, the transition period "will provide stabil-

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Pension plan status under new contract

The National Nuclear Security Administration's (NNSA) announcement of the new prime contract award has many wondering how the final contract details will be negotiated and implemented, including employee and retiree benefits. Until contract negotiations are complete, non-represented employee and retiree benefits will remain as elected during fall 2016 Open Enrollment. Retirees will continue to receive pension checks from Prudential and health benefits will be coordinated through One Exchange.

Represented employee benefits continue to be governed by their respective Collective Bargaining Agreements until the new contractor recognizes and negotiates with the existing unions.


All vested pension benefits are not impacted by the new contract. The final solicitation from NNSA states that the new contractor will be required to become a sponsor of existing pension plans and that employees in pension plans will remain in their existing plans or a comparable successor plan.

Contract decisions, including employee and retiree benefit changes (if any) under the new contract, will be announced in advance of implementation.

Remembering Dr. King

Jan. 15, 1929 - April 4, 1968

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SandiaLabNews

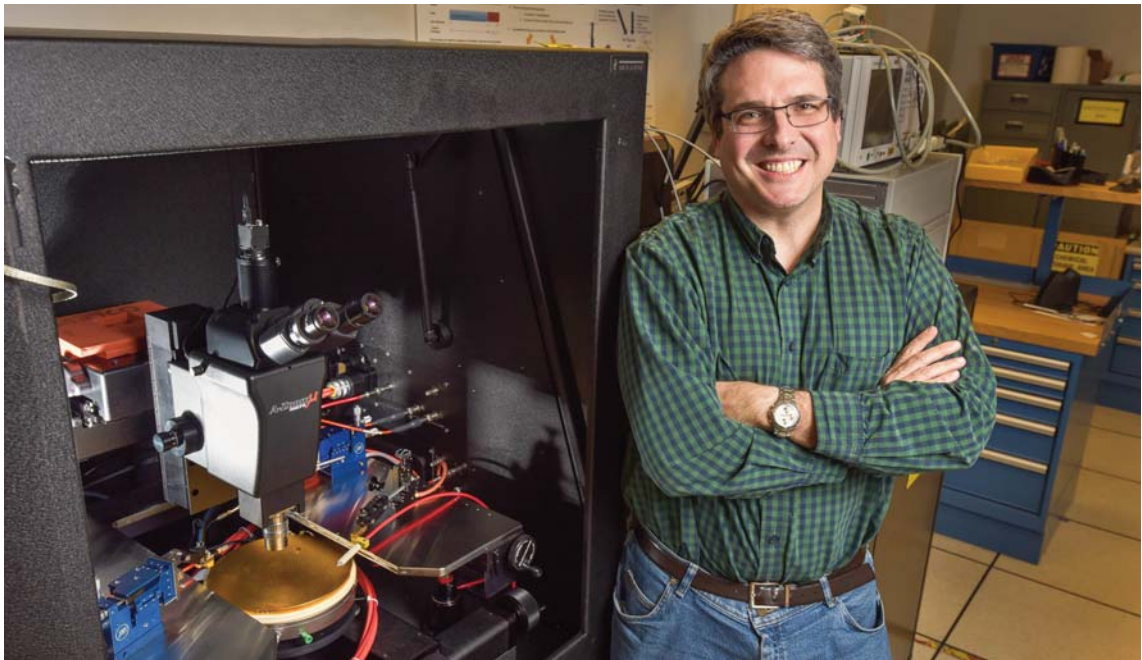
Since 1949 Managed by Sandia Corporation for the National Nuclear Security Administration



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Honey, I shrunk the circuit

Sandia research could improve defense electronics, electric vehicles, grids



ULTRAWIDE BANDGAP RESEARCH — Sandia electrical engineer Bob Kaplar heads a project studying ultrawide bandgap semiconductor materials. The project is answering such questions as how materials behave and how to work with them, which are steps toward improving everything from consumer electronics to power grids. (Photo by Randy Montoya)

By Sue Major Holmes

Sandia researchers have shown it's possible to make transistors and diodes from advanced semiconductor materials that could perform much better than silicon, the workhorse of the modern electronic world.

The breakthrough work takes a step toward more compact and efficient power electronics, which in turn could improve everything from consumer electronics to electrical grids. Power electronics are vital for electrical systems because they transfer power from its source to the load, or user, by converting voltages, currents, and frequencies. Sandia's research was published last summer in scientific journals and presented at conferences.

"The goal is to be able to shrink power supplies, power conversion systems," says Bob Kaplar (1767), who leads a Grand Challenge Laboratory Directed

Research and Development project studying ultrawide bandgap (UWBG) semiconductor materials. The project explores ways to grow those materials with fewer defects and create different device designs that exploit the properties of these new materials that have signifi-



Flexible work schedules
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cant advantages over silicon.

The project is laying the scientific groundwork for the new UWBG research area, answering such questions as how the materials behave and how to work with them. It also will aid Sandia's broader work through developments such as compact power conversion by using better semiconductor devices. "Understanding the science helps lead toward that second goal," Bob says.

Bandgap is a fundamental materials property that helps determine electrical conductivity and ultimately transistor performance. Wide bandgap (WBG) materials allow devices to operate at higher voltages, frequencies, and temperatures, and are starting to have impact on power conversion systems.

Emerging ultrawide bandgap materials are even more attractive because they could allow further scaling to devices that operate at even higher voltages, frequencies, and temperatures. When made into transistors, the materials have the potential to vastly improve the performance and efficiency of electrical power grids, electric vehicles, computer power supplies, and motors for such things as heating, ventilation, and air conditioning systems. Faster switching also could lead to smaller capacitors and associated circuit components, miniaturizing the entire power system

Highest-bandgap transistor

Sandia researchers demonstrated the highest-bandgap transistor ever, a High Electron Mobility Transistor, and published those results in the July 18 edition of *Applied Physics Letters*. Sandia published two papers

(Continued on page 6)



DALE MARSH marks 35 years as Sandia custodian. Page 2.



SPRAY COMBUSTION Consortium launched. Page 3.

That's that

It takes nothing away from the courage, the skill, and the patriotism of Alan Shepard, one of the original Mercury 7 astronauts and the first American to venture into space, to say that even as an 11-year-old in 1961 I knew his suborbital hop didn't come close to matching the earth-circling flight by Yuri Gagarin.



JOHN GLENN visited Sandia in 1988 while serving as a US senator from his home state of Ohio. Here he walks with Executive VP Orval Jones as they head for a briefing by Sandia experts on Intermediate Range Nuclear Forces Treaty verification technologies.

(Photo by Randy Montoya)

while we were spending just minutes beyond the atmosphere. Were we ever gonna catch up?

By February 1962, we had a plan: Get to the moon first. What we needed was a hero, someone to embody the best of what we aspired to be, someone to be our champion in the new Cold War battleground of space.

And NASA delivered! Almost as if they'd gone to Central Casting, NASA introduced the nation to its secret weapon: America, meet John Glenn, an All-American boy next door, a freckle-faced overgrown kid with a winning grin that belied a cold determination, a man whose mild and temperate demeanor masked a fierce competitiveness and a steely nerve. He seemed too good to be true, but he was the real deal, a man filled to the brim with what author Tom Wolfe called "the right stuff."

John Glenn carried our colors into orbit with dash and daring. When he was launched in the full glare of global media, the nation watched. When he reported from orbit, "Zero G and I feel fine!" we kids thought that was just about the most brilliant thing anybody ever said. On his triumphal return Glenn became a friend to presidents and celebrities who wanted to bask in his "right stuff" glow. He became a roving ambassador of American goodwill, the face of our open and optimistic society. What a contrast to the secretive Russians!

Glenn, a natural politician, was elected as a senator from Ohio, ran for president in 1984, journeyed again into space at age 77 as a crew member of a space shuttle flight and remained, all his days, an inspiration to Americans of all ages, but especially those of a certain age. In the lead-up to his shuttle flight in 1998 he said, "Just because I'm 77 doesn't mean I don't have a dream."

For all his accomplishments on behalf of the nation, though, I would bet that the thing that meant the most to John Glenn was his 73-year marriage to his wife, Annie. As his longtime friend and current NASA administrator James Bolden observed:

"For anyone who's contemplating marriage, you ought to go to school on the Glenns, because they can teach us a lot about what unending love, with undying respect and admiration for each other means. . . . There was never a question whether Annie was the love of his life."

John Glenn left us – and his beloved Annie – in December. As a man of faith, Glenn was by all accounts prepared for the great journey that he believed awaited him. Perhaps from somewhere, his Mercury 7 colleague and good friend Scott Carpenter is watching, saying, "Godspeed, John Glenn!"

See you next time.

— Bill Murphy (MS 1468, 505-845-0845, wtmurph@sandia.gov)

Sandia custodian Dale Vernon Marsh is longest-serving ever

When Dale Vernon Marsh was hired on as a custodian at Sandia in 1981, Kentucky mops — the big stringy kind — were the standard and Unger mops with telescope handles had not yet been developed. A lot has changed for Sandia and for the custodial profession in the intervening 35 years — Kentucky mops are long gone, for example — but through it all, Dale has remained a dedicated, loyal, and reliable colleague for the countless Sandians he has worked with. He recently celebrated his 35th anniversary at the Labs with his fellow employees.



DALE VERNON MARSH
(Photo by Randy Montoya)

Dale recalls that when he was first hired, basic custodial services were performed during the evening hours (1-9:30 p.m.) with not as many buildings to clean compared to today. In the early days, he says, custodians were often much more on their own. Dale says he enjoys the people, the camaraderie, and the teaming of today's custodial service workforce.

Custodial Services' modern and award-winning team cleaning approach is a far more technical and professional process today than it was when Dale came on board, with carefully engineered methods incorporated into the daily cleaning routine.

Although he has marked his 35th year at the Labs, Dale says he has no intention of retiring anytime soon, adding that he hopes to remain part of the Sandia family for many more years to come.

Colleagues offered warm congratulations to Dale at his anniversary celebration, knowing he has cemented his place in the annals of Sandia by being the longest continuously serving custodian in Labs history.

— C. Darrell Crawley, CS Ops Team Supervisor

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<http://www.sandia.gov/news/publications/labnews/>

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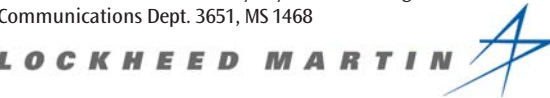
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The giving tree

Sandia members of the workforce donated more than 900 gifts so that all of the kids in the care of the New Mexico Children, Youth, and Families Department foster system would have a gift under their tree at Christmas. In the photo, Roberta Rivera, coordinator of Community Involvement's CYFD giving event, poses with a small number of the toys that overtook the Community Involvement suite during the collection period. The gifts overflowed into the hallways, cubicles, and closets as they awaited their trip to New Mexico Kids First for distribution to foster families.

(Photo by Randy Montoya)



Sandia donates 725 books to Livermore Veterans Administration Hospital

By Michael Padilla

Hundreds of local veterans will soon be able to enjoy 725 books thanks to the first-ever Veterans Day book drive at Sandia/California.

The books, donated by the site's members of the workforce, will be distributed by staff at the Livermore Veterans Administration to hospitals in Menlo Park, Palo Alto, and Yuba City.

The book drive was initiated by Security Officer Mark Cordes (8511), who got the idea after visiting his father-in-law at the hospital. He pitched the idea to members of the Military Support Committee (MSC), which agreed to spearhead the book drive.

"The books will help lift the spirits of veterans who are in the hospital, especially during the holidays," Mark says. "We are fortunate to have supportive and caring members of the workforce who donated new and gently used books."

Twenty boxes of books were delivered to the Livermore VA hospital on Nov. 22 by Mark and MSC members Brian Abelgas (8537), Sarah Flores (8005), and Rachel Sowell (8000).

"The MSC would like to sincerely thank the members of the workforce for their generous donations," Rachel says. "It is your continued support of our country's military and their families that enables the Military Support Committee at Sandia/California to facilitate and organize events for our military."

The MSC will work with the Livermore VA hospital staff after the holidays to see if they would like the site to host another book drive next year in honor of Veterans Day.



BOOKS AND MORE BOOKS – MSC members Sarah Flores (8005), Mark Cordes (8511), Brian Abelgas (8537), and Rachel Sowell (8000) pack up the 725 books collected for local veterans.



Spray Combustion Consortium formed to improve engine design

By Michael Padilla

Sandia has formed an industry-funded Spray Combustion Consortium focusing on improved understanding and modeling tools for fuel injection. Control of fuel sprays is key to the development of clean, affordable, fuel-efficient engines.

Intended for industry, software vendors, and national laboratories, the consortium provides a direct path from fundamental research to validated engineering models ultimately used in combustion engine design. The three-year consortium builds on work generated under DOE-funded research projects and will develop predictive engine fuel injector nozzle flow models and methods to couple them to spray development outside the nozzle.

Consortium participants include Sandia and Argonne national laboratories, University of Massachusetts at Amherst, Toyota, Renault, Convergent Science, Cummins, Hino Motors, Isuzu, and Ford. Data, understanding of the critical physical processes involved, and initial computer model formulations are being developed and provided to all participants.

Lyle Pickett (8362), who serves as the primary lead for the consortium at Sandia, says predictive spray modeling is critical in the development of advanced engines.

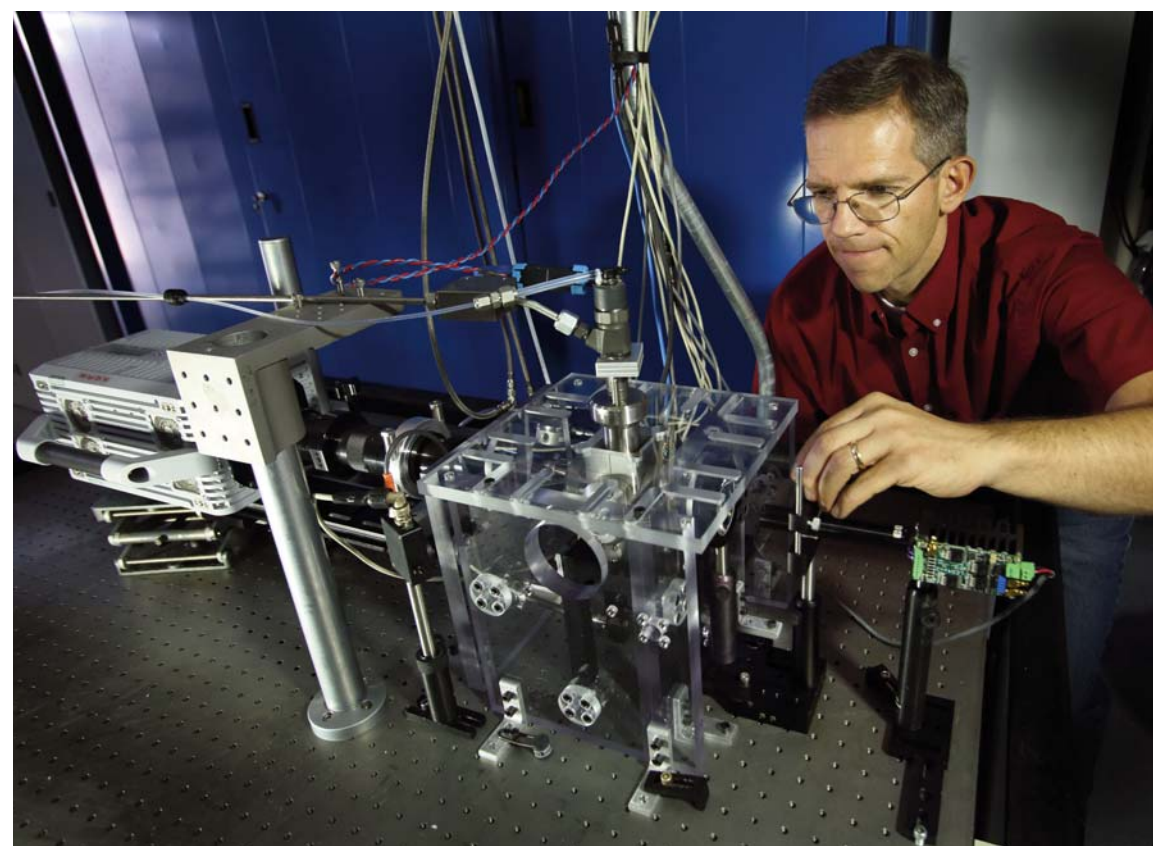
"Most pathways to higher engine efficiency rely on fuel injection directly into the engine cylinder," says Lyle. "While industry is moving toward improved direct-injection strategies, they often encounter uncertainties associated with fuel injection equipment and in-cylinder mixing driven by fuel sprays. Characterizing fuel injector performance for all operating conditions becomes a time-consuming and expensive proposition that seriously hinders engine development."

Industry has consequently identified predictive models for fuel sprays as a high research priority supporting the development and optimization of higher-efficiency engines. Sprays affect fuel-air mixing, combustion, and emission formation processes in the engine cylinder; understanding and modeling the spray requires detailed understanding of flow within the fuel injector nozzle as well as the dispersion of liquid outside of the nozzle. However, nozzle flow processes are poorly understood and quantitative data for model



SANDIA COMBUSTION researcher Lyle Pickett.

development and validation are extremely sparse.



INJECTOR INSPECTION – Lyle Pickett (8362), who serves as the primary lead for the consortium at Sandia, examines a fuel injector with the nozzle modified for optical access. The internal geometry is the same size as a metal nozzle (hole less than 0.2 mm) and the injector operates at realistic pressures. (Photos by Dino Vournas)

"The Office of Energy Efficiency and Renewable Energy/Vehicle Technologies Office supports the unique research facility utilized by the consortium to elucidate sprays and also supports scientists at Sandia in performing experiments and developing predictive models that will enable industry to bring more efficient engines to market," says Gurpreet Singh, program manager at DOE's Vehicle Technologies Office.

Performing experiments to measure, simulate, model

As part of the consortium, several experiments are underway using different nozzle shapes, transparent and metal nozzles, and gasoline and diesel type fuels. The experiments provide quantitative data and a better understanding of the critical physics of internal nozzle flows, using advanced techniques like high-speed optical microscopy, X-ray radiography, and phase-contrast imaging.

The experiments and very detailed simulations of the internal flow, cavitation, flash-boiling, and liquid

Sandia spearheads three-year industry-funded agreement

breakup processes are used as validation information for engineering-level modeling that is ultimately used by software vendors and industry for the design and control of fuel injection equipment.

The goals of the research are to reveal the physics that are general to all injectors and to develop predictive spray models that are ultimately used in combustion design.

"Predictive spray modeling is a critical part of achieving accurate simulations of direct injection engines," says Kelly Senecal, co-founder of Convergent Science. "As a software vendor specializing in CFD of reactive flows, the knowledge gained from the data produced from the consortium is invaluable to our future code development efforts."

Delivering results

Consortium participants meet on a quarterly basis to share information and provide updates.

"The consortium addresses a critical need impacting the design and optimization of direct injection engines," says Lyle. "The deliverables of the consortium will offer a distinct competitive advantage to both engine companies and software vendors."

It works for me . . .

Flexible work schedules retain employees and support business needs

By Kristen Meub

When John Niederhaus (1446) married his wife seven years ago, he knew he couldn't stay in Albuquerque. His wife was attending medical school out of state to be a transplant surgeon, and Albuquerque does not have any multi-organ transplant centers. While a move across the country was imminent for John, ending his career at the Labs was not, thanks to Sandia's flexible work schedule options.

Sandia has a variety of work schedule options, including the standard 40-hour work week schedule, the 9/80 schedule, the current 4/10 pilot project in California, adjusted start times, incidental telecommuting, long-term telecommuting, and virtual work. In John's case, virtual work was the right fit.

After he married, John had a series of temporary virtual work agreements with Sandia during the next three years while working from Wisconsin. When his wife found a job in Baltimore, new possibilities opened up. For about three years he had been traveling to Maryland regularly to meet with customers at the Army Research Lab (ARL). Now that he was based in Baltimore, he and his manager agreed he would work onsite at ARL once a week and work from a home office to access the Sandia network the other four days. With this arrangement, he became a permanent virtual worker.

"It's an awesome privilege to be able to continue working for Sandia," John says. "It's a perfect fit for our family, and it's been all around great for us."

Making it work

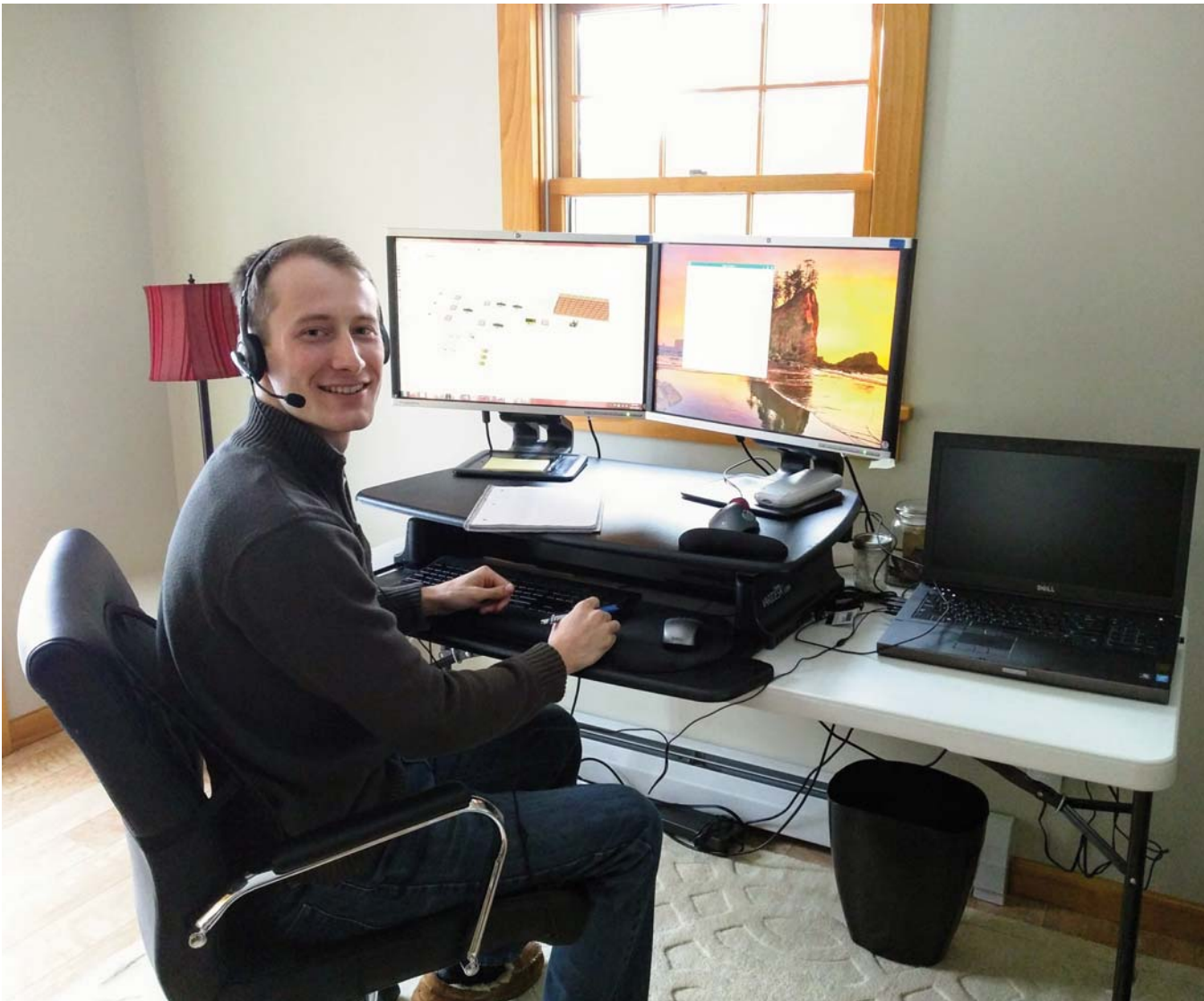
To make it work, John travels back to the Albuquerque campus every six weeks for in-person meetings, and he shifts his hours to align more closely with his coworkers. He appreciates Sandia's recent updates with Skype technology and says they have become an important part of how he stays in touch.

"The thing you miss out on most is the hallway conversations and the face-to-face contact, but this last year Skype video conferences have really helped with that," John says. "With that green light by a contact's name, you can see if someone's office light is on, even if you're not there."

While technology plays a major role in enabling virtual work, John says communications skills are essential for success as a virtual worker.

"Working remotely forces you to learn to be a good communicator and makes you proactive about staying in touch with all of your coworkers," John says. "It takes a deliberate effort. You spend a lot of time on the phone, and having a good headset and reliable phone and internet connection becomes essential."

Randy Summers (1446), John's manager who currently has one post-doc and three regular staff virtual workers, agrees: "They generally have high success and good communication with their regular project team, but gaining visibility beyond that project team can be difficult for a virtual worker, especially with the broader center management team. I specifically try to use mechanisms within our center to help mitigate that, and I require a certain frequency of travel back to Albuquerque — usually several days to a week per month back onsite. I expect virtual workers to be highly aggressive in getting opportunities to broaden their communications with other managers and employees."



NOAH ZENKER, who works for Sandia from his East Coast home office, says the Labs' flexible work schedule options have made it possible for him to continue working at a job he loves. (Photo courtesy of Noah Zenker)

Randy sees Sandia's flexible work schedule options as a powerful retention tool when the fit is right for the individual employee and his or her job responsibilities.

"In general, telecommuting and virtual work have been very helpful for retaining individuals you would lose without those options," he says. "We've generally had success with people, and



THE NIEDERHAUS FAMILY enjoys time together. John Niederhaus has been a permanent virtual worker for seven years. (Photo courtesy of John Niederhaus)

we usually make the determination based on the individual worker's circumstances. I've had virtual workers on my team the last 13 years."

Noah Zenker (6135) is another example of a Sandian who has been able to continue at the Labs through the flexible work schedule options.

Noah started working for Sandia in February 2012 and is currently focused on the design and development of complex systems models to evaluate and optimize system performance under uncertainty. After more than three years in Albuquerque, he moved back to the East Coast for family reasons.

"I absolutely loved the work I was doing at the Albuquerque location," he says. "My manager was very helpful and understanding and we figured out a way for me to continue working in the same group from a distance. I get to continue working a job that I love even though I can't be onsite."

Noah has worked to hone his communications skills and maintain a traditional work environment while working from home.

"A virtual worker needs to be someone who can be a clear and precise communicator over electronic means," he says. "Extensively using Sandia's Skype for Business tool for conference calls and video chatting with my manager has been very helpful for staying connected from a distance. Additionally, strong time management is a vital part of the role, and having a dedicated office in my home away from potential distractions has been essential."

Schedules that work for everyone

Virtual work was recently distinguished from telecommuting with the revision of HR100.3.2: *Initiate and Terminate Telecommuting or Virtual Work*. Approximately 315 Sandians have a virtual work or long-term telecommuting agreement currently in effect. Long-term telecommuting covers a range of scenarios, from working offsite full-time for a specified amount of time, to doing a mix of working days onsite and offsite throughout the week, as agreed upon in a formal telecommuting agreement.

Is it telecommuting or virtual employment?

Sandia recently revised HR100.3.2: *Initiate and Terminate Telecommuting or Virtual Work* to clarify and differentiate incidental telecommuting, long-term telecommuting, and virtual work. Incidental telecommuting describes days when a manager approves an employee to work offsite, often due to inclement weather or other non-routine reasons. No agreement is required for incidental telecommuting; only an email between the employee and manager. Long-term telecommuting applies to someone who routinely works offsite at least one day a week (up to full-time), but lives within commuting dis-

tance of a Sandia worksite. Virtual work applies to someone who works offsite full-time and does not live within commuting distance of a Sandia worksite.

The revised policy includes guidance for both employees and managers on how to evaluate telecommuting and virtual work as options and tips on how to improve the chance for success. Telecommuting and virtual work are not the right fit for every employee or every job. Check with your manager on flexible work schedule options that can work for both you and Sandia.



CINDY FULCHER HAS USED A MIX OF TELECOMMUTING and working onsite for the past three years in combination with a standard work schedule and says she appreciates the flexibility it gives. Here, Cindy, seen in the inset box in the lower right corner of the photo, joins her team remotely via Skype for an Expense Report standup/status meeting. Team members, from left, include Trevor La Pay, Vince VanGemert, Phuong Tran, Ben Brown, and Stacy Nagvyary. (Photo courtesu of Cindy Fulcher)

Cindy Fulcher (9545) has used a mix of telecommuting and working onsite for the last three years in combination with a standard work schedule, and appreciates the flexibility it gives.

“Telecommuting has been a really nice option for me,” Cindy says. “I do a lot of testing on software that Sandia develops, and I really enjoy my telecommuting days. They give me focused time for testing.”

During a typical week, Cindy will telecommute two days a week and work onsite the other three days, but she adjusts her schedule to be onsite more often as needed.

“I can sense when it’s important to be in the room for a meeting, so I’ll make sure to be onsite on those days,” she says. “I’m fortunate to be in a group that is open to telecommuting, and it helps me be successful in my job. There’s not a misconception with my group that telecommuting hinders productivity, or that it won’t be received well from a performance perspective.”

While telecommuting and virtual work are used by a small number of Sandians, having the option to choose between a 9/80 and standard work schedule is a long-standing benefit that affects every employee. Approximately 74 percent of Sandians work a 9/80 schedule, with 24 percent choosing a standard schedule, and 2 percent participating in the 4/10 pilot in California.

Cindy prefers the standard schedule for family reasons: “I have small children, and those long 9-hour days would be rough during the school year with dinner, homework, and everything else.”

Willie Marchetto (5773) has opted for the 9/80 schedule since he started at Sandia five years ago.

“It’s nice to have every other Friday off and be able to go on a weekend road trip without taking vacation,” Willie says. “It’s definitely a good benefit, and when we go recruiting we pitch it as a perk of working here. There’s a lot of interest in it, and not every employer offers it.”

Phyllis Teague (3644) prefers to work a standard schedule, and also uses the early start-time option: “My mom was visiting for a month a couple of years ago, and during her visit I shifted my start time to be able to spend more time with her in the afternoons. I ended up liking it so much that I kept that schedule after the visit ended. I like how quiet the mornings are for a couple of hours at work, and it’s also nice to have some daylight hours left when I leave in the afternoon.”

Flexible work schedules as a differentiator

Sandia is constantly looking to attract highly talented individuals with the right skills for the Labs’ work, and competition from other potential employers is stiff. Flexible work schedules help differentiate Sandia’s culture.

“The California site has a really hard time competing—it’s such a fight for talent, and the people who live right outside the gate may have heard of Lawrence Livermore, but they haven’t heard of Sandia,” Kimberly Edson (8522), the California site human resources manager, says. “Having flexible work schedule and work-life balance options is a leg-up in comparison to other high-tech companies.

Flexible work schedules help reduce Sandia's carbon footprint

National awareness of the need to reduce or eliminate greenhouse gas (GHG) emissions is continually increasing, and is reflected in Executive Order 13514 Planning for Federal Sustainability in the Next Decade. In response to this order, Sandia is working to meet a 25 percent reduction target for fiscal year 2020, based on a baseline from 2008 for six categories of indirect GHG emissions. These categories are referred to as “scope 3 emissions” and include energy transmission and distribution losses, air travel, ground travel, employee commuting, off-site water waste treatment, and off-site landfill use. About 51 percent of Sandia’s GHG emissions come from the daily commute of its workforce, and another 42 percent are related to air and ground business-related travel.

“Telecommuting, virtual work, videoconferencing, and collaborative technologies all help us work toward the goal of reducing our greenhouse gas emissions, but only if implemented appropriately,” says Benjamin

Henning (4143), who is working on Sandia’s environmental sustainability and GHG emissions reduction efforts. “For example, when several employees in a work group coordinate their telecommuting that can lead to more office sharing and can result in the reduction of electricity use. Both of those activities together would maximize the impact on our carbon footprint reductions.”

Benjamin also says flexible scheduling can make a big difference: “Adopting the 9/80 schedule and participating in the 4/10 pilot are one way the workforce can directly contribute to drastically reducing our carbon footprint. If all of Sandia could magically convert to a four-day work week, we would already meet or be close to meeting our 2020 goals.”

Sandians log almost 90 million miles of air travel annually, according to Benjamin. “Use of our videoconferencing and collaborative technologies can help reduce those related emissions.”

Many don’t offer as much in flexible schedules as we do, and they don’t offer work-life balance. These are the top ways we compete.”

When candidates are brought in for interviews at the California site, the human resources presentation focuses on flexible schedule options like the 9/80 schedule, the 4/10 pilot, and other work-life balance options.

head back to school. “I use virtual work a lot with year-round student interns,” he says. “They come in as part of the Cyber Defenders program, and we are able to keep those who have been a good fit in our talent pipeline as virtual workers while they are back at school. We’ve had a lot of success in being able to hire from this pool as students graduate.”

From a human resources perspective, flexible work schedule options are a key component of Sandia’s suite of customizable benefits and options available to employees.

“When I think about what makes Sandia cool, from an HR perspective, our work-life balance focus and flexibility differentiate us from other employers,” says Human Resources Director Rob Nelson (3500). “We provide a multitude of schedule options to meet the different needs of a multi-generational workforce. Whether someone prefers a standard schedule, a 9/80 schedule, or is participating in the 4/10 pilot in California, or is able to work from home or in another state — these are all ways that we meet employees where they are in partnership on delivering on our national security mission.”



UNDER SANDIA'S FLEXIBLE WORK OPTIONS, an individual could work for the Labs from almost anywhere.

“The reason for wanting it is different for everyone,” Kimberly says. “Some people want to volunteer at their kids’ schools, others want time to run errands, and some appreciate that they are helping the environment by not commuting to work that day.”

Managers also see the value in flexible work schedules as both an attraction and retention tool, and as a way to better support work needs.

“Cybersecurity is a highly competitive market, and sometimes the need arises for a high-performing employee to move to a different location, for whatever reason,” says Enterprise Cyber Security Manager Levi Lloyd (8965). “Virtual work has been a powerful tool to retain employees. We’ve had numerous instances of success. On the business side, it has been advantageous to have employees closer to customers through virtual work, and having people in different time zones has been helpful in creating greater coverage for the defense of Sandia’s network.”

Levi also uses flexible work schedules as a tool to keep promising student interns engaged with Sandia after they

Alternative Work Schedule pilot assessment under way

Since its launch last July 8, the 4/10 Alternative Work Schedule pilot in California has reached participation levels of 27 percent.

With the pilot now at the end of its six-month run, many employees are asking what’s next.

Currently, data is being gathered from surveys of both participating and non-participating employees as well as from manager feedback. Once the data is gathered, it will be used to make a recommendation on whether to move forward with Labs-wide implementation. That decision is expected in 2017.

In the meantime, exempt-level employees in the pilot can continue to stay on, or elect the 4/10 schedule.

Computer modeling to eradicate diseases

By Mollie Rappe

According to *The Lancet*, transmissible diseases such as tuberculosis, malaria, and HIV/AIDS claim more than 8 million lives each year.



PHILIP ECKHOFF

In the second seminar in Sandia's Science and Technology Speaker Series, held in late November, guest speaker Philip Eckhoff, director of research at the Institute for Disease Modeling, proposed that the best way to control these diseases is through total eradication.

Eckhoff compared the battle to keep diseases under control as a costly treadmill. Malaria control, for example, requires insecticide-laden bed nets, frequent spraying of insecticides inside houses, and prompt detection and treatment of those infected. These methods lead to mosquitos evolving insecticide resistance and the malaria parasite evolving drug resistance, which necessitates the development of new insecticides and treatments.

The way off the treadmill is through complete eradi-

cation of a disease, but that is daunting task, Eckhoff said. In the face of the challenges, though, there have been some successes. The first eradication triumph was smallpox, completely eradicated in 1980. In 2010 rinderpest, a devastating cattle virus, was the second disease to be eradicated. With luck and continued effort, Eckhoff said, polio will join these two soon; it remains in only three countries — Pakistan, Afghanistan, and Nigeria.

Malaria eradication has been attempted several times in the past 60 years. The most recent attempt began in 2007. Eckhoff uses computer modeling to aid in prioritization and decision making. Fitting the model to the questions public health officials need to answer, Eckhoff's team support an adaptive approach to eradicating malaria, he said.

For a large-scale demonstration, they are supporting work to eliminate malaria from southern Zambia. They are using a flexible and modular stochastic model with heterogeneous people plotted on a map. The model takes into account the mosquito life cycle and the effects of interventions such as bed nets, as well as representations of what is occurring inside the host.



PHILIP ECKHOFF, guest speaker from the Institute for Disease Modeling, talks about how he uses computer modeling to help eradicate diseases at the second Sandia Science and Technology Speaker Series held Nov. 29. (Photo by Lonnie Anderson)

Eckhoff concluded his talk with a broad bottom line: In addition to innovations in vaccines, medications, and detection tools, delivery and logistics innovations — such as using remote sensing to locate new, untreated households — are needed in the global eradication efforts.

The goal of Sandia's Science and Technology Speaker Series is to bring prominent scientists and engineers to Sandia to present on their work and its significance to society. The next guest speaker will be Russel Hemley, who makes super hard materials using extreme pressure and temperature. He is scheduled to speak Feb. 7.

ULTRA-WIDE BAND GAP

(Continued from page 1)

in *Electronics Letters* analyzing the performance of diodes made from gallium nitride (GaN) and aluminum gallium nitride (AlGaN).

"All three of these papers represent progress on the road to more compact and higher-efficiency power converters," Bob says. "They are also very exciting developments in semiconductor materials and device physics in their own right."

However, he cautions that the work doesn't mean UWBG devices are ready for the marketplace.

"There are a lot more improvements that need to be made to the transistor," he says. "The same with the diodes. There's a lot more optimization that needs to be done, a lot we don't understand about their behavior."

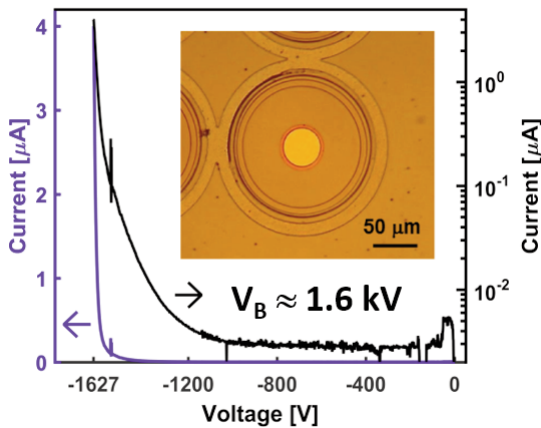
Researchers at Sandia and elsewhere have studied WBG materials, such as silicon carbide and GaN, for about two decades. In recent years, Sandia also has looked at next-generation UWBG materials such as AlGaN. In fact, Sandia coined the term ultrawide bandgap, which Bob says has caught on throughout the research community.

Researchers studying best way to grow new materials

One critical piece of the puzzle is figuring out the best way to grow new semiconductor materials. Researchers also must understand defects in the materials and how to process materials into working devices and find ways to improve passive elements such as magnetic inductors.

Semiconductor materials are characterized by their efficiency and effectiveness, so it's easy to assume you could make a power supply 10 times smaller if one material is 10 times better than another. But it's not that simple. "It depends on other components in the power converter. There's magnetics, there's capacitors," Bob says. "We're starting to look at what is a more realistic scaling."

He and his colleagues collaborate with Sandia experts in other fields to understand the relationship of semiconductors to other components in a system. "The semiconductor enables the system, but if you have something else that's limiting it, then you can't reach the semiconductor's full potential for shrinking the size of power conversion," Bob says.



AlGaN DIODE — The image illustrates the breakdown of the AlGaN diode, which is shown in the photo in the center. A diode has to block voltage, and the breakdown value is the maximum voltage that can be blocked. Both curves show the same data; the blue curve on a linear scale and the black curve on a logarithmic scale. (Image courtesy of UWBG Grand Challenge team)

Better semiconductor materials would mean higher absolute voltages for such uses as distributing power grid energy. Right now that's done by stacking devices in series to reach a desired combined voltage. Since UWBG materials have higher voltages than more traditional materials, far fewer devices would be needed in the stack. Bob says UWBG materials also could be useful at extreme temperatures or radiation environments — applications of interest for nuclear weapons or satellites.

Because of the potential impact on so much of Sandia's work, Bob expects UWBG research to continue after the current project ends in September. "We lay the foundation and then we want it to continue to advance, both the science and the eventual applications."

Authors of the *Applied Physics Letters* paper are Albert Baca (1766), Andrew Armstrong (1123), Andrew Allerman (1126), Erica Douglas (1744), Carlos Sanchez (1764), Michael King (1768), Michael Coltrin (1126), Torben Fortune (1766), and Kaplar. Team members also presented the results at the Device Research Conference at the University of Delaware in June and the Lester Eastman Conference on High Performance Devices at Lehigh University in August.

Sandia researchers also published a paper on the highest-ever unipolar figure-of-merit for a vertical GaN power diode grown on a GaN substrate. Figure of merit measures the trade-off between electrical conductivity and the breakdown voltage. Authors of the paper in the June 23 edition of *Electronics Letters* are Armstrong, Allerman, Arthur J. Fischer (1117), King, Michael van Heukelom (1768), Michael W. Moseley (413), Kaplar, Mary H. Crawford (1100), and Jeramy R. Dickerson (1123), and J.J. Wierer, formerly of Sandia. The July 21 edition of *Electronics Letters* published Sandia's work in achieving the highest breakdown voltage and figure of

merit ever reported for a quasi-vertical PIN diode made from AlGaN. Authors are Allerman, Armstrong, Fischer, Dickerson, Crawford, King, Moseley, Wierer, and Kaplar.

About 40 Sandia researchers work on the project in some capacity. Among those leading research focus areas are Allerman, materials growth; Armstrong, defect physics and radiation effects; Baca and Crawford, device architectures and fabrication; and Jason Neely, evaluating device performance.

Others are associated with the project, exploring potential devices and systems that could be enabled by UWBG materials. Manager Olga Spahn calls them "Friends of the Grand Challenge." In addition, a research community outside Sandia is coalescing around UWBG — dubbed the "Ultrawide Bandgap Guild" by longtime semiconductor researcher and Sandia fellow Jerry Simmons (1000).

Honeywell gets nod to manage Sandia

(Continued from page 1)

ity for the workforce employed under the current contract and efficient continuity of operations for NNSA's vital missions performed there."

Honeywell International Inc. is an American multinational conglomerate company with a global workforce of 130,000, of whom 58,000 are based in the US.

Honeywell manages the Kansas City National Security Campus in Kansas City, Missouri, and Albuquerque, New Mexico, for NNSA. In 2014, Honeywell successfully completed one of the nation's largest industrial moves ahead of schedule and under budget from the old Kansas City Plant at the Bannister Federal Complex to the new Kansas City National Security Campus. The company produces a variety of commercial and consumer products, engineering services, and aerospace systems for a wide variety of customers, from private consumers to major corporations and governments. Honeywell is headquartered in Morris Plains, New Jersey.

Northrop Grumman Corporation is an American global aerospace and defense technology company formed by Northrop's 1994 purchase of Grumman. The company was ranked as the fifth-largest defense contractor in the world in 2015. Northrop Grumman employs more than 68,000 people worldwide. It ranks No. 124 on the 2015 Fortune 500 list of America's largest corporations and ranks in the top 10 military-friendly employers. It is headquartered in West Falls Church, Virginia.

As described on its website, Universities Research Association is a consortium of 89 leading research-oriented universities, primarily in the United States, and also in

NORTHROP GRUMMAN

URA UNIVERSITIES RESEARCH ASSOCIATION

Canada, Italy, Japan, and the United Kingdom.

The not-for-profit URA Corporation was founded in 1965 for management and operation of research facilities in the national interest. URA's charter directs the organization "to acquire, plan, construct, and operate machines, laboratories, and other facilities, under contract with the government of the United States or otherwise, for research, development, and education in the physical and biological sciences ... and to educate and train technical, research, and student personnel in said sciences."

From 1967 to 2006, URA was the prime contractor to DOE for the creation and operation of Fermi National Accelerator Laboratory near Batavia, Illinois. In 2007, URA partnered with the University of Chicago to form Fermi Research Alliance, LLC, which now holds the Fermilab contract.

Four member universities of Sandia's Academic Alliance are also members of URA, including Purdue University, University of Illinois at Urbana-Champaign, University of New Mexico, and the University of Texas at Austin.

Retiree deaths

Anthony Trennel (age 78)	October 3
Paul Percy (76)	October 20
Don Louis Rost (92)	October 23
Frank Wunderlin (70)	October 23
Ira McKinney (92)	October 24
Mary Wilson (89)	October 26
Louis Nogales (78)	October 27
Geraldine Becker (94)	October 30
Vivian Schmedeman (88)	October 30
Jack Cannon (79)	October 31
Charles Sandoval (91)	November 2
Isabel Martinez (64)	November 3
Robert Adams (93)	November 7
Mildred Gilpin (88)	November 7
Richard Green (87)	November 13
Paul Seward (84)	November 15
Robert Brooks (93)	November 16
Kenneth Jones (83)	November 20
Robert Bradshaw (71)	November 22
Theresa Eberhardy (83)	November 23
Arnold Andrade (87)	November 24
Roger Smith (70)	November 24
Donald Holck (85)	November 26
Bryon Cloer (59)	November 27
Jacqueline Hill (88)	November 30
Jose Llamas (91)	December 1
Robert Adkins (76)	December 1
Benjamin Roscoe (84)	December 2
Gary Concannon (66)	December 2
Thomas Plummer (74)	December 3
Richard Hanson (78)	December 4
Lloyd Melick (94)	December 15
Elizabeth Cook (89)	December 16
Michael Ortega (38)	December 18



TOURSANDIA

http://tours.sandia.gov

SANDIA CLASSIFIED ADS

MISCELLANEOUS

MACRO TELEPHOTO LENS, Sigma, for Nikon SLR, 70-300 mm, f/4-5.6, w/lens hood & cap, hardly used, excellent condition, \$50. Mann, 505-604-4236, ask for Brad, call or text.

LAPTOP, Dell Inspiron 5551, 15.6-in., Windows 10, 18 mos. old, rarely used, \$175; nativity set, ~12 w/18h, w/music box, from 1960's, \$20. Colgan, 344-3776.

SKI & CARGO BOX, Thule Evolution, ~90-in., \$75 OBO. Pechewlys, 505-856-6878.

PROJECTION TV, Sony, 57-in., free-standing, still works great, has good color, free. Lunsford, 286-4850.

GLASS COMPUTER DESK, w/shelf, CD/DVD storage, keyboard shelf, 42" x 24" x 30", pristine, \$70. Werner, 286-9393.

NM PHILHARMONIC, Mozart, Jan. 28, Orchestra, up to 4 tickets, \$67.50 ea. OBO. Harvey, 242-1619, mah0mdk@aol.com.

DINING SET, solid oak, inlay top, 4 chairs, table extension, side table, \$250. Mulville, 410-5337.

ARMOIRE & HUTCH, dark cherry finish, \$500/both. Hennessey, 505-269-6243.

KEROSENE HEATER, Sears, portable, \$50; Insectron electric bug killer, \$25; bed frame, full/queen, heavy duty, \$30. Walkington, 505-235-1025.

ALARM SYSTEM, 23-pc., X10 Home, motion, door, window, sensors, calls police, no monthly fee, \$249. Chabai, 505-228-0038.

'DIRTY DANCING' TICKETS, 2, Popejoy, June 17, 8 p.m., front row, center, mezzanine, \$170/both. Verley, 221-7827.

'MATILDA THE MUSICAL' TICKETS, 2, Popejoy, Friday, Jan. 13, 8 p.m., Orchestra section, \$63 ea. Kelly, 299-3527.

REFRIGERATOR, Kenmore Coldspot, side-by-side, white, excellent condition, \$275; 3 dressers, rocking chair, cedar hope chest. Tapia, 280-8888.

PENDLETON SOUTHWEST TRAILS BLANKETS, 5, all #127/1000 limited edition, never used, in boxes, selling together, \$1,500. Stinchcomb, 505-266-4212.

LCD TV, Westinghouse, 30-in., component & composite inputs, no digital inputs, needs wall mount, free. McKay, 294-2935.

TRANSPORTATION

'03 MITSUBISHI GALANT, \$1,500. Goff, 727-515-7350.

'02 CHEVY S10 LS, extended cab, red, new tires, 17-in. Hot Wheels rims, 94K miles, \$6,600. Aragon, 881-4795.

'10 CORVETTE, 430-hp, beautiful crystal red, heads-up display, removable hardtop, heated seats, DVD/Navigation/Bluetooth, Borla exhaust, \$32,000. Richmond, 505-382-7477.

'94 MUSTANG GT, 5.0L V8, excellent condition, call for more info. Lynch, 505-463-2828.

'00 CHEVY MONTE CARLO, excellent condition, \$2,800. Torres, 505-401-6900.

'11 BMW 135i, black exterior/interior, clean, 50K miles, up-to-date maintenance, warranty, \$21,500. Wareing, 505-652-2883.

'05 LEXUS RX330, AWD, beige, new timing belt, tires, brakes & battery, low miles, Carfax, \$7,500. Hanks, 505-977-3372.

REAL ESTATE

3-BDR. HOME, 2 baths, 1,675-sq. ft., 2-car garage, custom cabinets, North Four Hills, \$240,000. Burnett, 974-5653.

3-BDR. HOME, 2-3/4 baths, 2,512-sq. ft., pool, new carpet, paint & pool cover, La Cueva, MLS# 879729. Boverie, 505-401-3881.

3-BDR. HOME, 2 baths, 1,846-sq. ft., 320 acres, outbuildings, Estancia valley home, 9227 Hwy. 55, \$375,000. Bishop, 505-384-1162.

4-BDR. HOME, 1-3/4 baths, 1,720-sq. ft., wood floors, slate tile, very close to Sandia, must see, MLS#879944, \$185,000. Robbie, 505-401-0721.

3-BDR. HOME, 2 baths, 1,800+-sq. ft., 2-car garage, w/custom cabinets, Four Hills, solar panel, open concept, fully re-modeled, \$275,000. Newell, 331-0187.

How to submit classified ads

DEADLINE: Friday noon before week of publication unless changed by holiday.

Submit by one of these methods:

- EMAIL: Michelle Fleming (classads@sandia.gov)
- FAX: 844-0645
- MAIL: MS 1468 (Dept. 3651)
- INTERNAL WEB: On internal web homepage, click on News Center, then on Lab News link, and then on the very top of Lab News homepage "Submit a Classified Ad."

If you have questions, call Michelle at 844-4902.

Because of space constraints, ads will be printed on a first-come basis.

Ad rules

1. Limit 18 words, including last name and home phone (If you include a web or e-mail address, it will count as two or three words, depending on length of the address.)
2. Include organization and full name with the ad submission.
3. Submit ad in writing. No phone-ins.
4. Type or print ad legibly; use accepted abbreviations.
5. One ad per issue.
6. We will not run the same ad more than twice.
7. No "for rent" ads except for employees on temporary assignment.
8. No commercial ads.
9. For active Sandia members of the workforce, retired Sandians, and DOE employees.
10. Housing listed for sale is available without regard to race, creed, color, or national origin.
11. Work Wanted ads limited to student-aged children of employees.
12. We reserve the right not to publish any ad that may be considered offensive or in bad taste.

3-BDR. HOME, 2-1/2 baths, 2,050-sq. ft., Centex, gated Terracita, open floor plan, updated appliances, master on bottom, \$229,500. Walker, 863-441-3861.

WANTED

SMALL PICKUP, S10, Ranger, Tacoma etc., prefer AT, <100K miles & \$6,000. Krok, 626-676-1052.

Mileposts



New Mexico photos by Michelle Fleming

California photos by Randy Wong



Larry Andrews
40 2631



Cindy Huber
30 9534



Mike McDuffie
30 3653



Mary Moya
30 5448



Ray Trechter
30 6522



Paul Vianco
30 1831



Stephen Montague
25 5644



Tim Riley
25 857



Nenita Walther
25 2212



Patrick Xavier
25 1543



Michael Rector
20 5965



Tasha Marie Barrera
15 10504



Ruby Chavez
15 5014



Anna Garcia
15 1900



Alex Gonzales
15 4226



Leslie Juarez
15 2244

Remembering Rev. Martin Luther King, Jr.

“We must develop and maintain the capacity to forgive. He who is devoid of the power to forgive is devoid of the power to love. There is some good in the worst of us and some evil in the best of us. When we discover this, we are less prone to hate our enemies.”

*— Rev. Martin Luther King, Jr.
Jan. 15, 1929 - April 4, 1968*

